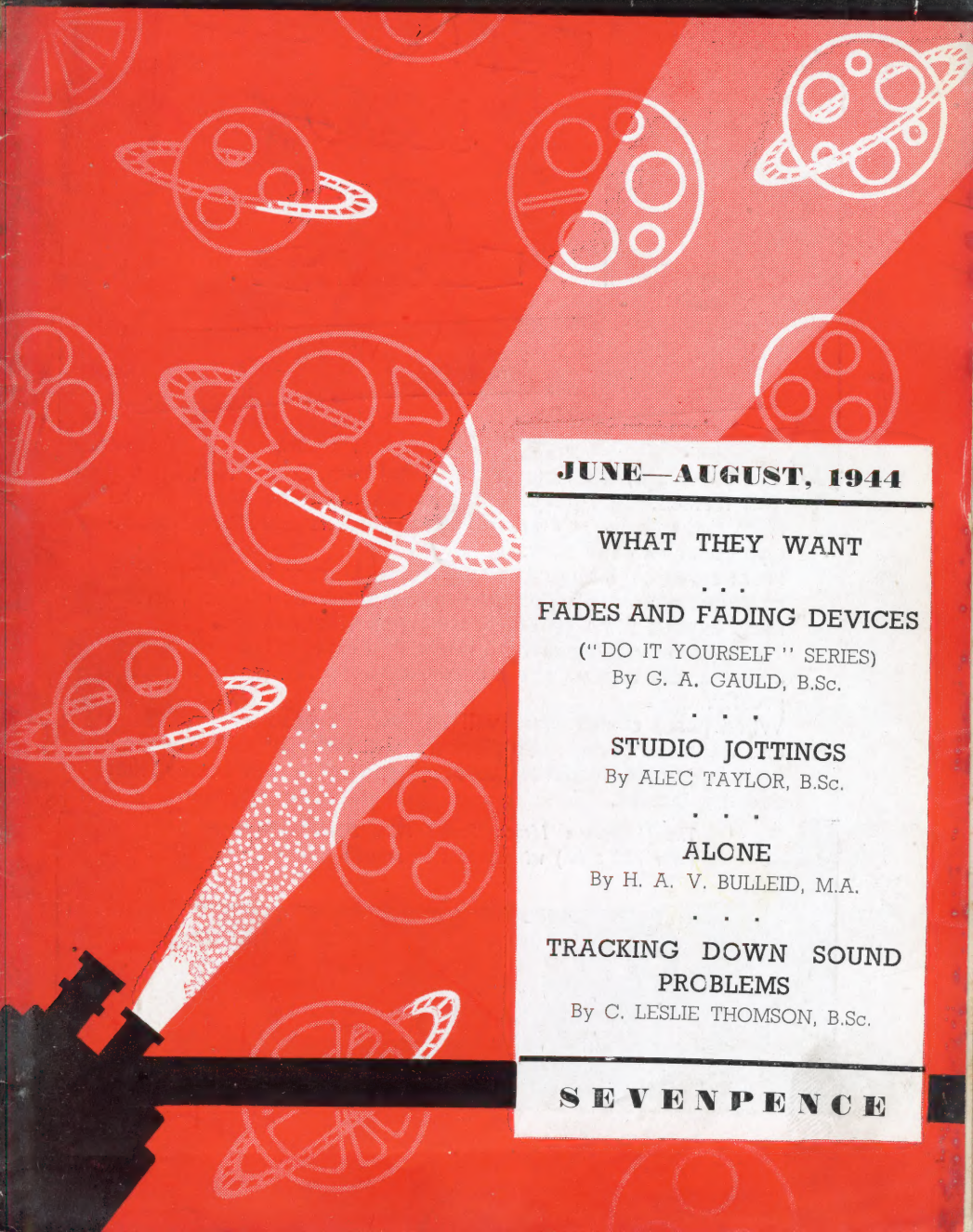
AMATEUR CINE WORLD



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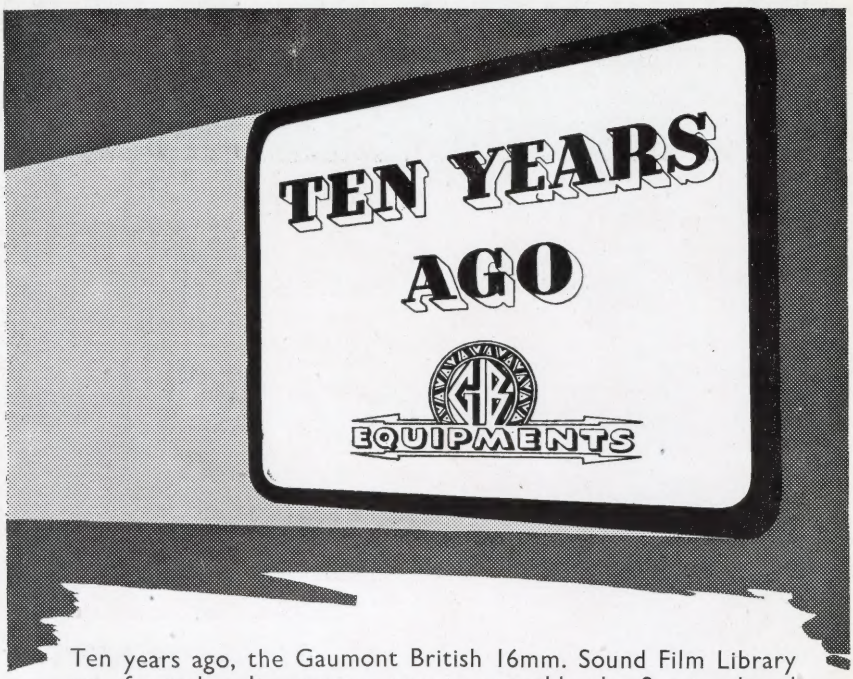

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SUMMER
JUNE, 1944—AUGUST, 1944
VOL. II. No. 3
(*Old Series, Vol. IX, No.* 12)

THE ONLY JOURNAL SOLELY DEVOTED TO SUBSTANDARD CINEMATOGRAPHY

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GORDON S. MALTHOUSE, *Editor*

Filming in Colour

THE student of cinema will readily recognise the work of the best-known directors. He will talk to you of the 'Hitchcock touch,' of 'Langishness'; he will enthuse over the early films of Clair, rejoice over the gay subtleties of Lubitsch and the majestic canvases of Ford.

The student of cinema will likewise readily recognise that monochrome will give place to colour, as silence has yielded to sound. But will he be able to affirm his recognition of the work of the best-known directors *in colour*? Certainly it is unlikely that he could do so here and now, if only for the fact that of the five directors mentioned, only one has so far produced a colour film. But even when every programme at every cinema is wholly in colour (including the news reel), will a director emerge who uses colour as the painter uses it—in other words, in so markedly individual a style that is at once recognisable as his and none other's, just as one recognises a Van Gogh, or an El Greco?

To expect it imposes one more burden on the director, whose skill and artistry emerge from a co-ordination of the artistic and technical processes and the handling of the human element. But in the highly organised business of film making the art director, the cameraman and the laboratory can be called in to contribute their share. What of the amateur who has no one to whom he can delegate his powers—who, being unable to modify contrast after exposure (to take but one instance), is the more in need of the "pre-exposure" services of the expert?

This reflection is prompted by the excellent paper, "Art—For Colour's Sake," given by Mr. Jack Cardiff, the well-known Technicolor cameraman, at a recent meeting of the Kinematograph Section of the Royal Photographic Society. Mr. Cardiff emphasised the importance of the director's not leaving the control of colour content too much in the hands of the art director and cameraman; the design must be his and would be achieved to perfection when two people, discussing a picture, could ask: "Was it in colour?" "Well, do you know, I really forget. I believe it was."

That is the crux of the matter. Colour must not be blatant. Its application must be governed by its relation to picture content and dramatic values. Yes, very proper sentiments, but how can this application be realised, you ask, in a personal film in which you can only take the landscape as you find it? The fact is that if you aim to produce a successful scenic film in colour you must not take the landscape as you find it.

As pointed out at the same meeting by Mr. Ronald Neame, photographer of the new Noel Coward film "This Happy Breed," colour photography (from the technical point of view) tends to isolate and stress colours which, while actually present in the subject, are not noticeable under normal conditions. This effect, too, is accentuated by the fact that a cine film is viewed under conditions in which it is surrounded by a frame of darkness.

The amateur can only pin his faith to trial and error and his own good "eye for colour." He must isolate, in his mind's eye (or, more practically, with a piece of cardboard or wire) every salient feature of the landscape that appeals to him, visualise it as a frame of film and consider how each succeeding scene will harmonise in colour content. He must analyse it in detail before he presses the motor release. He must weigh up the effect of close-ups in which there is likely to be a pronounced over-all colour. Will it harmonise or will it jar? He must overcome the propensity of colour film to stress colour by ensuring that it shall not stress an unco-ordinated medley of colour.

He can produce his own effects to enhance dramatic value. A case in point which he might well bear in mind is the sequence, cited by Mr. Cardiff, in "Blood and Sand" in which a band of bull-fighters are in a train returning to their native village. First we see some drab-looking figures around the seats of the carriage. They are unsuccessful and discontented; the colour is dully subdued. Then one of them speaks of the only successful member of the party. A newspaper is lowered, and instantly the camera cuts to a close-up of a gay, sparkling, colourful figure seated in front of the slashing crimson lining of a cloak. Then the newspaper is raised and the scene reverts to its over-all drabness.

It is effects such as this that illustrate the artistry of the director. It is only in effects such as this that colour is used as it should be used; to illustrate the action. There is a wonderfully fascinating field of experiment here for the amateur who, in doing everything for himself, produces a favourable set of conditions for evolving a characteristic and plainly recognisable style—THE EDITOR.

What They Want

We publish below a final symposium of readers' views on the design of post-war apparatus. It is regretted that many long-detailed letters can be represented only by a few brief lines of summary, but all have been carefully collated, and every worth-while suggestion finds expression, in however truncated a form, in the following pages.

NO feature which has ever appeared in our columns has brought such a spate of interesting correspondence as the discussion upon post war designs for cinematograph apparatus. It is somewhat difficult to summarise all of the opinions, because of the great variety of ideas which emerge.

Some of the "new" improvements which are asked for have, in fact, been available in some designs of equipment for a considerable time, while some so-called "improvements" are based on misconceptions and are the very reverse of what they seem to the incompletely informed user. And even the demands for the apparently impossible are very salutory in providing incentives to research and development.

Some general tendencies can be traced in the mass of opinions received, and we propose to analyse these below.

Size of Film. Camera workers as a whole are very interested in 8mm., but 9.5mm. has some staunch supporters, with 16mm. definitely the choice for serious work. In projection, 16mm. is the basis of most of the comments.

Cameras. Two very different classes are discussed—the hand camera for the pleasure cinematographer and the studio type camera for the serious maker of film productions, whether amateur or professional.

There is a widespread demand for the light and most compact instrument for hand use. There is no marked preference for magazines and cassettes as against spools, but sprocket transit is often mentioned. We entirely agree with the desire for register pins in the gate mechanism, and feel that, if a back rewind is provided, it should be capable of rewinding a whole film, not merely a few frames.

Manufacturers should note the very real demand for a frame counter, although one correspondent prefers the less accurate device of measuring the length of film by the thickness of the coil, for the reason that it can only work when there is film to work it. The idea is worthy of preservation but might be attained by a system which is not subject to the vagaries caused by variations in the thickness of film base.

We heartily endorse the desire for a viewfinder which makes accurate allowance for parallax error, rather than the approximation devices at present most generally available. We also agree with the suggestion for a waist level as well as eye-level finder.

It is, however, entirely unnecessary for all lenses to be of focussing type. Those of modest aperture, if provided with an infinity and a close-up setting, would adequately deal with all subjects. We would remind readers that the vast majority of all outdoors work can be done with lenses of the order of f/3.5, and that an f/3.5 lens working at its maximum aperture gives much better picture quality than an f/1.9 lens stopped down to f/3.5.

We agree with the reader who asks for a diaphragm which closes *right* down. The reader who suggests automatic change of aperture with change of taking speed may not be aware that this has already been provided on one continental camera. It is a highly desirable fitting.

Speed ranges of from 8 to 48, or if possible 64, frames per second are excellent for the studio type instrument, but will not assist the designer in keeping hand cameras small. For the same reasons the turrets for three or four lenses advocated by some serious workers are not so suitable for the pocket camera, as a rapid bayonet change-fitting.

We agree with those who advocate handier carrying cases, and would remind readers of the excellent case provided some years ago with the Agfa Movex 30, which enabled the camera to be lifted out sideways, and had a carrying strap with an adjustable non-slipping rubber shoulder pad.

One reader asks for a quieter motor, but when working in noisy surroundings it is sometimes impossible to tell whether the camera is running. One continental camera has a circular plastic footage counter disc which appears in the viewfinder and slowly revolves when the camera is running.

It is suggested that the camera motor should run for 25 to 30 seconds. A longer run means a much bigger motor, a heavier camera, and greater difficulty in maintaining constant speed as the motor spring unwinds; in any case, it is quite bad practice to run a camera on the same shot for longer than about 15 seconds.

Instant starting at top speed is also a doubtful advantage. The less efficient camera gives one nice over-exposed frame which immediately identifies the beginning of a shot, especially on retakes, and assists the editor. All films need cutting before showing. Even if you want to do single frame work to match

in with normal run stuff, you can easily adjust the aperture for the single shot work, and if there is one over-exposed frame when you revert to normal speed it can either be cut out or darkened with dye. In neither case will it be noticed.

A delayed action attachment on the "holiday" type camera is an excellent idea, but better still is the suggestion that a tripod or some kind of steadying strap should be built in as an integral part of the camera. Nobody, however, seems to have been concerned with the provision of adequate lens hoods, and the fitting of filters at the rear and not at the front of these hoods.

For the serious worker it is suggested that the sub-standard camera needs all the facilities provided on the 35mm. professional camera. Actually it needs to be more complex, because most professional workers now do fades, dissolves, multiple exposures and similar tricks on the optical printer, whereas the sub-standard worker will, at any rate for the immediate future, have to do them with his camera.

We were glad to see some reference to camera shape. This requirement has been recognised by the U.S. Army who, in the Cunningham Combat Camera, have produced a 35mm. instrument of most unorthodox shape, but very comfortable to hold under all conditions. The "Filmo" shape still has much to commend it, but we wonder that the screw-in bottom handle and finger trigger of the 35mm. "Eyemo" has not also been adopted for some models of the 16mm. camera.

Sub-standard cameras which take both sound and picture on the same film have already proved to be unsuccessful for a variety of reasons both technical and personal. We certainly, however, need a sub-standard sound track camera on 35mm. lines for serious work.

Projectors. The outstanding requirements seem to be less noise, more film, more light. It is interesting at this point to refer to a masterly paper on sub-standard projector design given by Mr. R. H. Cricks, F.R.P.S. at a recent joint meeting of the British Kinematography Society and Royal Photographic Society.

He made many practical suggestions regarding fan and gear design and running speeds which would tend to elimination of noise, and he advocated a twin head projector, with a common motor, sound amplifier system and switch control panel to permit long run programmes. This would give the individual projection head time to cool down between one film and the next.

For amateurs, however, the question of capital expenditure on such an elaborate machine will arise; a better solution may be the provision of the large diameter spools and long spool arms advocated by some contributors. This will in its turn create mechanical problems in dealing with the take-up of the larger diameter of film, and may necessitate a separate motor and specially designed slipping clutch on the take-up spindle.

Mr. Cricks and several of his audience voiced similar objections to those stated by Mr. Gillett of B.F.I. in *A.C.W.* regarding the undesirability of the 25-hour life lamp for projection, and Mr. Cricks suggested the provision of a 100 hour life lamp as an alternative. He also advocated the biplane lamp instead of the monoplane, as giving greater efficiency. Projector illumination optics are susceptible of great improvement and one line of research which was suggested was the combining of both mirror and condenser with the lamp itself. A system has already been evolved in which the mirror was integral with the prefocus lamp holder.

The discharge lamp is by no means ready for its task yet. Its discontinuous spectrum makes it quite inadequate for colour projection, while it takes quite an appreciable time to strike when first switched on.

The Filmoarc projector, already gives large pictures at a long throw, but only an arc will do the job at present. A range of lenses would require a corresponding range of condensers because such a high degree of magnification necessitates optimum performance of all components if the maximum light output is to be obtained.

There is a marked desire for exact control of speed. The Paillard Company embodied in their projectors an electro-mechanical governor which was highly efficient at speeds of both 16 and 24 frames per second. Owners of existing projectors can exercise a considerable degree of control by means of a stroboscopic disc attached to a revolving portion of the machine.

The elimination of unwanted light spill from lamp houses is highly important and taken insufficient care of in most present day designs. Such light degrades the screen picture and impedes the vision of that part of the audience sitting behind the projector.

Motor rewinding is another almost universal demand, but rewinding 1,800 feet of film mechanically is going to present some problems. We advocate some kind of cushioned take-up to prevent snatch on starting and speed control on the emptying reel. When the take-off reel is nearly full and the other one nearly empty the gear ratio is very high and will cause the latter to revolve dangerously fast. When the whole of the film is finally wound off, the take-off reel will jerk dangerously if there is no cushioned control.

It is undesirable that during rewinding the lamp should be alight, or that the film should pass above it, as this not only wastes current but also tends to excessive drying of the film.

In an effort to get as much light as possible out of the projector, manufacturers have fitted lenses with very large apertures. Such apertures not only aggravate the aberrations in the lens but also give such a small focus depth that

it is very difficult to hold a picture fully in focus. It links up with Mr. Crick's contention that pressed-out metal gates are quite inadequate to control the film in proper plane and that properly machined gates should always be provided.

We do not find ourselves in agreement with the correspondent who advocates 500 watts as a minimum light for home projection. We have repeatedly seen sub-standard pictures ruined by having too much light through them, the truly opaque pieces of foreign matter showing strongly, the tonal values of the picture itself being rendered grey and the highlights washed out, the flicker (which depends on contrast between the clear and obscure periods as well as upon frequency) gravely aggravated, and due to the accommodation factor of the human eye, no very great apparent increase in light intensity.

Emulsion build-up on gate surfaces can occur on any and every make of film, occurs also with 35mm. film, and is dealt with in some cases by "waxing" the film surface before projection. A large proportion of Service 16mm. films are so treated.

There is some difference of opinion as to whether projectors should or should not run in reverse. Our only comment is that, until we get proper miniature moviolas, the projector which reverses is an invaluable instrument for film editors.

Mr. Bernard Gillett suggests that we have reached the limits of sub-standard sound quality using the present technique of sound printing, speed and sound optics. We hardly agree with this. Mr. Gillett has ignored one of the most important factors ; the film emulsion itself, which is undergoing continuous improvement. Apart from that, the best that is obtainable in 16mm. technique is by no means typical of the normal standard available to the everyday user, while an even more potent cause of bad quality is dirty and neglected projectors, gummed-up sprocket teeth and so on, all of which profoundly and adversely affect quality. Projectionists must improve as well as projectors and film.

It has been pointed out by Mr. Norman Leevers, a leading sound experimenter, that the design of speakers for sub-standard work is greatly inferior to that of theatre loud speakers, and that the use of directional speakers carefully placed will at once step up sound quality from sub-standard films. Mr. Cricks has also stressed the comparative lightness of construction of existing sub-standard sound projectors, and advocated heavy castings and sturdy build and correct selection of gears and other drives to eliminate the many small induced mechanical ripples which tend to degrade present sub-standard quality.

We have more closely examined the Varley sound film referred to in our last issue and there illustrated. The illustration is slightly misleading as it shows only one sound track down the right hand side of the machine. The complete film has tracks down two sides. It will be seen that the film bears two sets of pictures, one inverted in relation to the other, each with its appropriate sound track. The pull-down is to the extent of two pictures, so that alternative frames come in front of the projector mask, and the surface speed of the sound track past the sound gate is equivalent to that of 35mm. film.

The system is most ingenious, but two slight disadvantages are apparent. First, two films are indissolubly married together. That is not a great disadvantage because, after all, two pieces of music are similarly married together on a gramophone disc. The other point is that the pairs of sprocket holes are immediately adjacent to the sound tracks, and unless scrupulous care and attention is given to processing, developer flow around these holes will set up ripple effects in the sound track which will to some extent nullify the advantages gained otherwise.

Other considerations. We were somewhat surprised that there were so few references to other facilities required by amateurs.

Workers who required elaborate camera equipment had apparently quite overlooked the need for editing equipment. Sub-standard splicers are quite good in design, but the film editor needs an efficient moviola of either sound or silent type, and the sound film editor needs a multi-head rewind or synchroniser to enable him to match up his track to his picture.

Mr. G. H. Sewell, A.R.P.S. referred in an earlier article to the optical printer, which will become a necessity if the sub-standard worker is to stand on a technical par with his 35mm. contemporary.

Better types of titling equipment will also be necessary. Most of the existing designs suffer from basic defects which cannot be balanced out by the large number of gadgets provided with them.

With the increase in the use of instructional films there will come a requirement for simple forms of cartoon camera apparatus with proper light control, veeder counter and so on.

Dr. J. Yule-Bogue, Ph.D., M.R.C.V.S., recently delivering to the R.P.S. Kine Section a paper on "The Making of Physiological Films," referred to the need for precise processing, and instanced cases where colour records of the same physiological subject under the same controlled conditions on film of the same batch, had been returned with somewhat different colour balance when sent for processing at different times. Such differences were slight enough to be relatively unimportant to the ordinary worker, but must be eliminated for technical and special work, even though a special rate might have to be paid for such additional control.

One reader asked for 8mm. colour film "as grainless as Kodachrome." Why not Kodachrome itself ? We have had it once in 8mm. and presumably when peace returns it will be as easily available once more.

On the question of nomenclature a reader pleaded for the use of the term "frames" instead of "feet" in describing lengths of film, "x 3" and similar terms instead of the focal length in inches for describing long focus lenses, and we ourselves would like to see the more accurate determination of light output of projectors in lumens, rather than the misleading quotation of the wattage value of the lamp (which gives no indication of the efficiency of the optical system). But we are afraid that, human nature being what it is, it will be a long time before the old bad habits are eliminated. However, the manufacturer might have a shot at educating the user in the right way.

Conclusion. It is very satisfying to know that such a lively interest exists among our readers for the possibilities of the future, and it is to be hoped that this collation of opinions may have a beneficial effect on developments of new apparatus.

A brightly-lit Close-up in the final sequence. —Miss J. L. Danks in "Alone" (1941, by H. A. V. Bulleid)

Alone

By H. A. V. BULLEID

Many readers have asked that the scope of the "Famous Library Films" series, already wide, should be enlarged to include notable amateur films and professional documentaries available to the amateur. And what better subject to inaugurate this new development than one of our contributor's own productions? So we over-ruled the modestly reluctant author by the unanswerable argument that his own analysis of his own work would set the right key for his criticism of that of others in subsequent issues.—Editor.

Production	.. H. A. V. Bulleid.
Date	.. .. June, 1941.
Length	.. 410 feet 16mm.=17 mins.
Derivation	.. Episodes from everyday life.

ERICH VON STROHEIM once remarked that if a subject could not be expressed in a single sentence, that subject was unsuitable for filming. He intended to convey the axiom that what is said is less important than the manner of saying it. By this excellent precept *Alone* gets a flying start . . .A young wife waves good-bye to her husband in the forces ; returns home ; suffers an unwanted caller, a raid, a lonely night, a lonely breakfast; and greets him on his next return. Such are the bones of the action covered by the film's run of 17 minutes.

The producer of an Amateur film enjoys the inestimable advantages of absolute control of every production phase, complete freedom of style, ability to state his ideas bluntly and without compromise, and opportunity to satisfy his personal whims. These four freedoms meant in the present instance that the film would open in natural colour and end in monochrome (because I dislike colour in film drama and welcomed an opportunity to surpass its effects with superior monochrome effects later, in contrast to the old professional gag of the Grand Color Finale) ; that some interiors would be shot against dead black sets (a whim) ; that the unwanted caller would be suitably snubbed (for the busybody sympathizer and intruder is a type I loathe) ; and that the air raid would be realistic, *i.e.*, no debris flying around : for, however narking it may be to professional script writers, the exceedingly happy fact remains that the vast majority of raids brings no debris near the vast majority of houses. I decided also to do everything in my power to make the photographic phase outstanding. My previous picture had been a hectic burlesque on local politics, with a strong narrative quite contrary to the von Stroheim warning, in which photographic style had suffered sadly. These details will show the patient reader the angle of approach in preparing the treatment, and enable him under similar circumstances to do the same or opposite according as the ideas attract or repel him.

(1) A young wife stands on a hillside in the evening sun and waves to a passing train : as it becomes lost in the distance she walks away : the sky darkens, the sun sets.
(2) She arrives home, ponders on the remains of their tea, gives the cat a saucer of milk.
(3) She drifts across to the piano, plays a few bars of Humoresque. A woman caller knocks at the door : she hears, stops playing. Woman knocks again. She inconsequently shuts the piano, sits dead still. The caller shrugs, turns, goes . .
(4) . . . walks away down the road. A searchlight beam appears over the valley. The young wife stands looking at a calendar. There is a flash in the valley : she turns. Another flash, nearer ; the house perceptibly shakes. Another, and the light flickers, fails. But the searchlights die out, the raid is over.
(5) Carrying a candle she walks upstairs to bed, kneels : first her thoughts are distracted by her husband's belongings : then she prays.
(6) The cat strolls in, settles comfortably. She stands by the venetian blind, in the pale moonlight.
(7) Morning. She makes the tea : but breakfast is for one, alone.
(8) Time passes. She does her bit with the W.V.S.
(9) She sits knitting. The gate clangs, there comes a familiar knock . . .The knitting lies on the floor, she is in her husband's arms.

The whole of sequence (1) was shot on location at Box Hill, Surrey. Three trips were needed before the essential of a steady sun in a clear sky at 6 p.m. was available. Jo (the wife) wore a camel-hair coloured coat with scarlet gloves. The hillside was fresh green, the sky a deep blue, and I therefore had a camel-red-green-blue *motif* which would not clash in any combination. Two or three drops of water via a fountain-pen filler plus much blinking gave a suspicion of tears for the two close-ups ; there is also

a C.S. of hand (with ring) holding glove before the train appears. The train shots required morning sunlight, and were made some five weeks later : the 3″ lens caught the train as it emerged from the cutting, in a sweeping pan ; then with 1″ lens (the beloved f/2.7 Tessar) and slowly closing iris mask it was covered in two more shots, the latter showing it as a mere blob over a mile away. The intercut low-angle shots of Jo are from several distances, increasing as the train recedes : and in the last remote L.S. she turns away. The idea of the darkening sky is expressed by a shadow falling across a wild rose by the wayside. In darker shots (1 stop under-exposed) Jo walks away. Then the sun sets : one shot filmed at one frame per seven seconds for an hour shows the fascinating sweep of the clouds, and another at one frame per three seconds shows the sun actually disappear over the horizon. The former had an exposure variation from f/8 to f/2.8 during the hour, checked by meter clamped to camera and lens adjusted in minute steps as required. Of 100 feet of Kodachrome shot about 85 were used, thanks to fairly cast-iron scenario and the good luck that the sunset chosen remained photogenic to the end.

The second shot of sequence (2). The mirror effect adds to the interest of such shots.

(2) The sunset leaves a blue sky, so no one notices that the next night exterior shot is in monochrome tinted blue to match. The camera is just outside a wrought iron garden gate, which swings shut as Jo approaches and enters the house. Within, the blue tint continues till she switches on a light, and we see her hang up her coat and glance at herself in the mirror (see still). This effect is simply contrived by lighting the set normally, then suppressing all lights except the one flood from the direction of the front door : as the actress flicks the switch, all are again switched on. The blue dye is carefully applied only up to the first fully lit-up frame. The effect is repeated in the next shot : we see a dim room, then the light goes on and Jo enters. The remains of tea are on a small table : her own cup was not emptied, and his box of Swan Vestas lies forgotten by his plate. Close-ups show these things, and her reactions. In any C.S. of food very strong top and back lighting is essential in addition to overall lights, otherwise a distressingly flat and dead appearance results. Her finger ruminatively touches the matchbox, then the tea spoon : at this tinkle the cat looks up. She smiles down, pours out some milk, hands over the saucer ; the cat cautiously drinks. It will be noted that there is plenty of action in the sequence : in addition the inanimate objects are made to tell their bit by implication. Susie the cat rehearsed splendidly but went temperamental at the first take so that extreme patience was demanded from all concerned before the shots were satisfactorily completed. This was nothing new ; other cats have pulled the same gag on me before. Audiences hand out cartloads of praise for Susie's swell performance, maddening the leading lady and causing the director to wonder which is the next cat that'll spit in his eye.

(3) C.S. of open music, Humoresque. This piece was chosen partly for its suitability as accompaniment, partly because it is played almost entirely on the black keys which permits a pleasing photographic pattern. The piano was black, the set black, the girl dressed in black. A single ornament of three candles was set on the piano top for compositional purposes. Very strong top, back, and side lights only were used throughout. The intruder is introduced by a hand knocking on the door : in reaction C.S. Jo's hands immediately freeze. Very low angle shots portray the gathering indignation of the caller. Only her dumpy ankles are shown as she turns with a shrug ; and as she passes through the gate the shot is held till the gate clangs shut . . . (assistant, off). The blue tint assists these night exteriors.

(4) The scenario called for seven raid exteriors, all looking across the valley : one normal, one with searchlight coming on, two with explosion flashes, one with a terrific flash, one with flickering light over the horizon, and finally one with the searchlight fading out. The " real thing " being uncontrollable and unsatisfactory, I took a still of the valley, had it enlarged to 10 by 8, and so arranged it that I could light it from front and back. The " searchlight " was a slit cut in several thicknesses of tissue paper with irregular edges, pivoted behind the still, tissue-paper clouds completing the illusion by causing the end of the beam to vary in height. Explosion flashes were penknife work on the emulsion, crude but

perfectly effective, thus :—pin-point on one frame, scar on next, all emulsion off third. The big flash was magnesium in front of the still. The flickering was magnesium behind, plus cardboard shutter with irregular appertures. All this is, of course, dependent for effect on its montage with the other elements, which I selected as follows :— the music flutters off its stand ; the clock stops ; a picture falls with a crash ; and finally, the light flickers and fails. From time to time one happens on a particularly fortunate arrangement of material, and this raid is an example ; especially the beginning, which I quote . . .

(a) C.S. wall-clock, pendulum swinging, lit "all-over" 133 frames.
(b) L.S. exterior across valley, with searchlight moving. 81 frames.
(c) CM.S. Jo looks at calendar on wall. 116 frames.
(d) L.S. (as b) Flash of an explosion (on frames 11/12/13). 19 frames.
(e) CM.S. (as c) Jo whips round. 28 frames.
(f) L.S. (as b) Other flashes (frames 6/7/8 and 15/16/17/18) 23 frames.
(g) CM.S. Piano music sways, falls forward off stand. 37 frames.
(h) CM.S. Frilled shade over room light sways. 35 frames.
(i) C.S. Jo turns her head away from looking at it. 40 frames.
(j) C.S. (as a, but lit from one side only) clock stopped. 64 frames.

The scenario called for a shot of the curtains swaying, but this was found to be redundant. Multiples of 8 frames were used in the first cutting of the sequence, but the pruning and rearrangement in the final lengths quoted gave an improved effect : perhaps because the tempo is fiercely staccato, opposed to an ordered rhythm. Shots (g) and (j) are lusciously effective. The later shots of the light flickering were done in stop-motion, giving one- and two-stop variations between frames. The (very slight) effect of the house shaking was done by camera-wobble in a M.S. of Jo.

(5) Carrying a candle, Jo walks upstairs. She actually carried a bare photoflood. There was a raid on at the time, and since we had inadvertently forgotten to black-out the hall, we suffered a brisk but brief interruption. The shadow of the bannister dances downwards . . . a superb effect I shamelessly borrowed from the famous Sewell-Ahearn film, *Extinction*. Mixes from bedroom-slippers to electric shaver, blazer, stick, pipe, slippers, indicate Jo's thoughts as she kneels, by candle-light, again with black background. Then are intercut Church interiors, with a shaft of sunlight striking the altar. The candle burns low, goes out : Jo buries her face in her hands : the camera pans down to the light pattern on the counterpane. To secure a shot of the candle wick

By candle-light. Mainly ¾-back-lit from the left, but one back light R. to give depth.

falling over and the flame dying out, a piece of burned wick was inserted in a pool of wax, and set : this was lit and timed. On repeating the performance, the shot was secured without waste. The effect was enhanced by a gradually increasing blue tint being applied as the wick heels over.

(6) After a peaceful night exterior, M.S. shows Jo operating the venetian blind shutters: this was a blend of evening light outside with photofloods inside, correct balance yielding the necessary soft effect. L.S. shows the door steal open, the cat enters. Jo smiles, The cat settles unconcernedly : slow diagonal wipe-out.

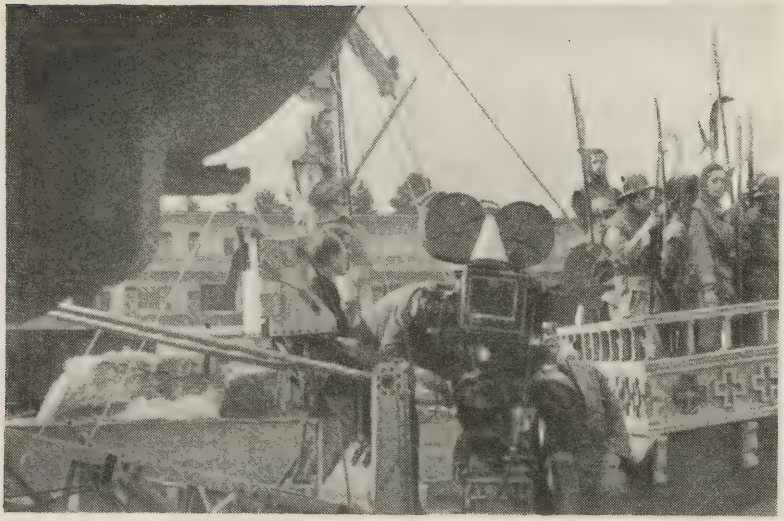
(7) Morning—portrayed by slow fade-in on L.S. of fleecy clouds lit by the rising sun over the roof-tops. In C.S. the kettle boils fiercely : Jo's hand parks the tea, pours the water, twiddles the tea-pot lid, with mannerisms intended to convey her detachment. Laid for one only. In M.S. she turns away for a moment, with a great sigh. In C.S. in the dresser, one cup-hook only is empty. . . Slow iris-out.

(8) (a) Fade-in C.S. an hour-glass. Gauze fade-out.
(b) Fade-in C.S. W.V.S. Badge on dress. Fade-out.
(c) Gauze fade-in. C.S. an hour-glass. Slow fade-out.

After much research a 20-minute glass was found, and a suitable holder designed and made in walnut by a colleague. Gauze fades were used to soften the blending of the "time" and "occupation" *motifs*.

(9) This short sequence was tinted sepia, except the three exterior shots which, being daytime, were not tinted. The gate-clang was effective as the sound had twice before been expressed. The characteristic knock, Jo's start, the abandoned knitting—quite a standard method of brief narration by Close-ups. We never see the husband ; merely the back of his head and shoulders, with Jo in his arms. This was just too clever, and is curiously ineffective. However, I

(*Continued on page 86*)



Model E1. Technicolor Camera being used without 'blimp.' Focussing is being done by hand.

Studio Jottings by ALEC TAYLOR, B.Sc.

To the serious amateur the knowledge of "how it is done" takes nothing away from his enjoyment of a film as entertainment, and certainly enhances his appreciation of its construction values. Here is the first of a series, by a well-known studio technician, of production notes on new and forthcoming films.

ON the set of the latest Michael Powell-Emeric Pressburger production, "A Canterbury Tale," which is on the floor at Denham as I write (but now receiving its premiere—*Ed.*) I met an old friend. This friend is one of the few well-known British cameramen who specialise in trick photography as applied to the motion picture. His name is Fred Ford. Fred is probably one of the best trick men in this country, and samples of his work have appeared in countless pictures during the past fifteen years, or longer.

When I came across him, he was engaged upon the supervision of the testing of a back-projection scene prior to final shooting taking place. "Ironing out the wrinkles," Freddie called it. The set was of a cafe, complete with all the usual trimmings, built in front of a back-projection screen, upon which a moving picture of a street in Canterbury was being flashed from behind.

The street scene was visible through the windows of the cafe set, and the composite shot—as viewed through the Mitchell view-finder—was that of a cafe with all the life of Canterbury passing by the window.

On the centre of the projected image was the usual red "flare spot," a filter so placed that the centre of the picture, where the light is, of course, the greatest, would not be exposed more than the remainder. Regarding this latter: I once noted that this basic factor of B.P. (studio term for back projection) work had been overlooked—in an American film, too—with an effect most unpleasant.

During the spells when his immediate attention was not required, Freddie related some of his experiences as a film cameraman. His most unpleasant job, he told me, was during the production of M.G.M.'s "Goodbye Mr. Chips," the film in which Robert Donat and Greer Garson appeared. As will be recalled, Mr. Chips (Donat) travels with his German friend to Bavaria on holiday and, during the course of this period, goes mountain-climbing (presumably in the Bavarian Alps). As he climbs the mountain, he suddenly finds that he is lost, makes calls and cries and, ultimately, locates Miss Garson, who is in a similar plight.

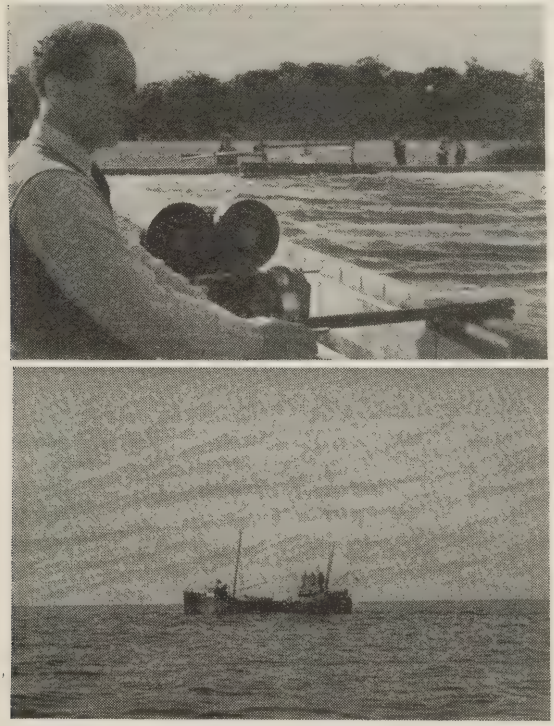
In all the mountain-climbing shots, the script called for swirling mountain mists

such as would be encountered at about 8,000-9,000 feet. Of course, to produce studio mist is a very easy matter, but the normal method was out of the question as several of the technicians were suffering from a mild epidemic of catarrh, and the fumes of the artificial mist—paraffin-smoke—proved, understandably, too much of an irritant. Fred said that he lost count of the number of takes that were spoiled by coughs and sneezes.

As production was being held up, the producers invoked Fred's aid. His method of dealing with the situation was simplicity itself though, as he admitted, his clothes smelt like those of a motor mechanic for weeks after. Firstly, the necessary shots of Mr. Donat and Miss Garson were photographed, complete with all action and dialogue, against the mountain background, sans mist.

On a neighbouring stage, Fred was at work photographing thick paraffin fumes swirling back and forth, and from every conceivable angle. His camera, a Mitchell (the standard studio job) was mounted on a dolly and pushed, during shooting, up, down, round, in fact, as he related, in all directions except under. The result of his gyroscopic endeavours was then over-printed on the first shots and the effect was of a person (or persons) on a mountain slope with eddies of mist semi-obscuring them : quite the authentic Alpine setting.

More recently, Fred has been engaged on the shooting of model shots for George Formby's latest vehicle, "Bell Bottom George." In this, he had the unenviable task of re-enacting a sequence at sea in which one boat is chased by another round a stationary steamship. This latter is supposed to be a Government Customs and Excise boat, and is on the track of some smugglers who are in one of the small boats—the one being chased. After several circuits, the two boats are involved in a collision with a third—a sailing ship—which arrives on the scene, and chaos, coupled with the capture of the smugglers, results.



Above : Studio tank at Pinewood Studios, showing 'wave-makers,' with Bell and Howell camera in foreground. Below : Model ship, with 'cloud' background. Similar to that used in the shooting of the model shots for Columbia-British's "Bell-Bottom George."

Simple as this may sound, three weeks had passed before Fred would acknowledge that he had "got it in the can" to his satisfaction. The camera he was using was a standard Bell and Howell, with a hand-driven gear box giving three times normal speed (72 frames per second). The outfit was mounted—on its tripod—on a platform which, during shooting, was rocked slowly to simulate the movement of the deck of a ship. Wave-makers (hinged boards flapping in the water) supplied the necessary sea-like movement, and the effect of realism was heightened by the reduction in speed of all the action when the film was projected.

A little over a month ago, I saw the latest Technicolor camera at present in this country (Model E1) in operation, and was greatly impressed by the completeness of its every detail. Of the tri-film pattern (which means that three films, sensitive to red, blue and green respectively, travel in register through the camera's two gates) it has an ease of operation which leaves nothing to be desired.

Fitted with geared panning and tilting motions, one is assured of rock-steady tilts and

Model E1 Technicolor camera mounted on crane. Camera is being used for silent shooting.

perfectly smooth pans. Encased in its very comprehensive "blimp," it is possible to use this camera as close as two feet to the recording microphone without causing sound interference. Such "epic" colour films as "The Life and Death of Colonel Blimp," and "For Whom the Bell Tolls" were shot on cameras of this type.

One interesting feature of the "E1" is the timed focussing gear (called the Selsyns Gear) which "pulls the focus" electrically. A small electric motor drives an arm through an ever-decreasing spiral at a speed which is controllable. The movement of the arm corresponds to the focus of the lens and, by reducing or increasing the speed of the motor, the point of focus can be controlled by timing : hence, one has to time the action of the actor and the movement of the camera, to arrive at the correct time at which to set the Selsyns. In shots from cranes, where the camera movement is sometimes rather fast, focussing problems are thus rendered easier of solution.

The job of "focus pulling" is normally done by hand, either by the lens mount itself (where the camera is being used without "blimp") or by a knurled knob, suitably calibrated, on the body of the camera "blimp." In order to appreciate the difficulty of the professional "focus puller," the amateur should remember that, in studio practice, shooting is normally carried out at an aperture very rarely less than f/3.5 ; therefore, every movement of the principal actor must be followed by the band of focus. In the case of a 50mm. lens, this may be less than 10 inches. If one watches very carefully, slight softening of focus can occasionally be noted, though this happens but infrequently in these days of photographic perfection.

ALONE—*Continued from page 83*

have always stuck to my resolve not to make improvements to completed films in the light of later experience and so this remains as just one of those blunders that line the long path of Experience.

The "END" title is very plain with the hour-glass lightly superimposed. The credits follow. The advantages of this is that the opening need not be cluttered up : the film starts with a title *She walks alone, like the beauty of the night,* superimposed on a moonlit scene in a woodland glade : this has a gauze fade to the main title. There are no sub-titles : the flow of action is smooth enough to render them superfluous.

The music accompanies the numbered sequences as follows :—

(1) Solveig's Song, from Peer Gynt ; *Grieg.* Orchestra.
(2) Valse Triste ; *Sibelius.* Orchestra.
(3) Humoresque ; *Dvorak.* Violin with piano accompaniment.
(4) Romeo and Juliet Overture ; *Tchaikowsky.* Orchestra.
(5) The same, continued ; then Ave Maria ; *Gounod.* 'cello with piano acc.
(6) Same as (2)
(7) Morning, from Peer Gynt ; *Grieg.* Orchestra.
(8) In silence.
(9) As (4).

In each case selected passages are used to fit the action, specially in the case of the lengthy Romeo and Juliet Overture, from which three movements are used. The records are suitably marked with tailor's chalk, to correspond with a detailed cue-sheet. On one occasion I used a friend's radio as the amplifier and speaker, and a member of the audience remarked how very lucky it had been that the wireless programme had fitted the film so nicely. On another occasion I overheard the remark that it was quite an easy subject for a beginner, as the actress simply had to be followed, doing all the ordinary things.

Such are the sobering influences : and I sometimes wonder, when I toss a brickbat at some Famous Film, whether I, too, may have lacked sympathetic understanding. . .

"DO IT YOURSELF!"
practical ideas for the handyman

FADES AND FADING DEVICES

In each issue our contributor supplies worth-while ideas: things to make and things to do. Suggestions for gadgets are welcomed.

By G. A. GAULD, B.Sc.

THE "toothbrush and comb" technique of making titles as described in the previous issue suggests another application, namely, the construction of a fading glass.

In the same article, I warned readers against the use of trick titles unless they formed a definite contribution to the film as a whole. The same remarks apply to fades. Fades tend to slow up the tempo of a film but are often effective in denoting a lapse of time or the commencement and termination of distinct sequences. They should never be used indiscriminately.

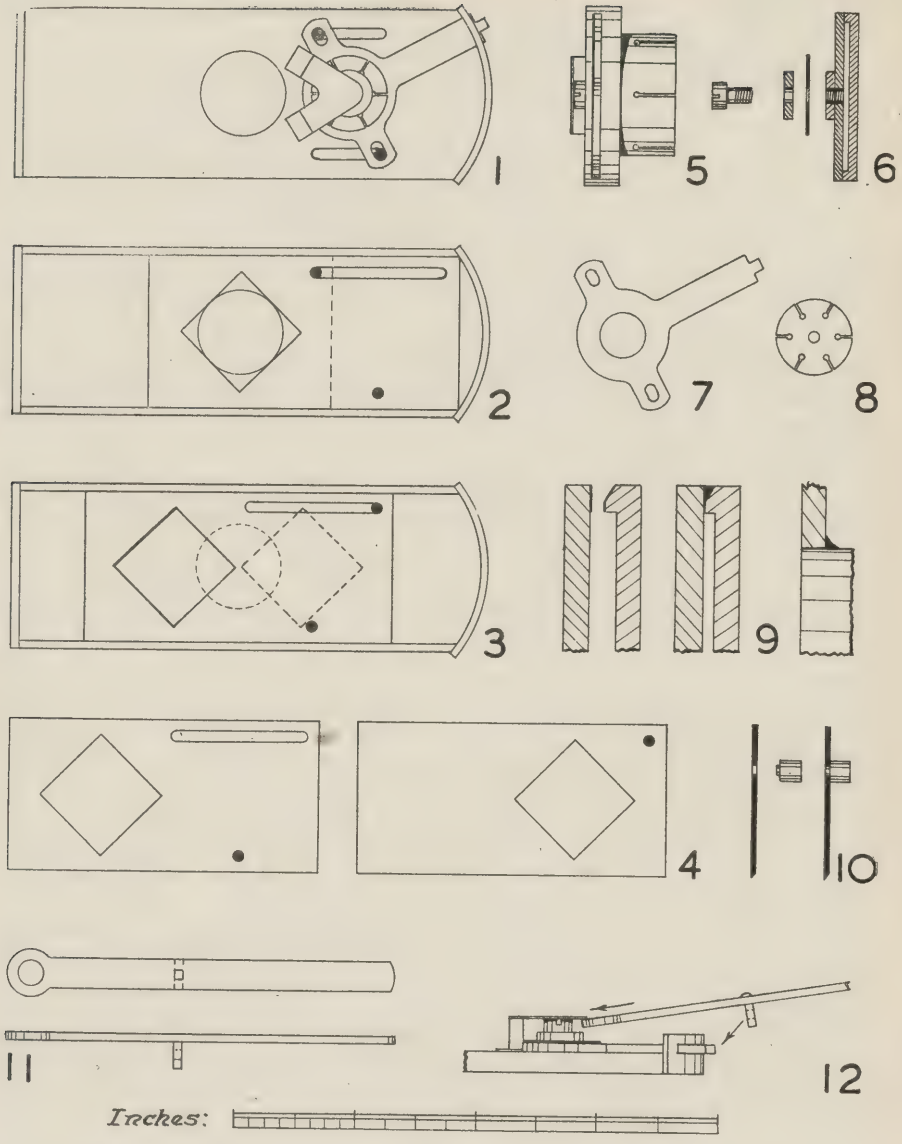
Subtitles are essentially a part of the story of a film, but introductory titles are not. Therefore, a fade on the last introductory title provides an effective transition to the true beginning of the story when the first pictures appear on the screen. Similarly, at the end of a film, a cut to the title "The End" is too abrupt. It is better to fade the last scene out slowly (and it need not necessarily be the sunset beloved of the amateur filmer) and hold the interval of "black" screen before "The End" is faded in. During this interval, the viewer is still "living" in the picture and his imagination will carry it forward to the real conclusion which he pictures in his own mind, whether it be of the "lived happily ever after" variety, or otherwise. The viewer should be allowed these pleasant moments before he is brought back to the realities of the work-a-day world. The gentle intrusion of the words "The End" on the black screen will help in quietly bringing him back to earth as the lights go up. I have often stressed the value of good showmanship in the amateur presentation of films and it is just as important to leave the audience with a feeling of well being and satisfaction as to stimulate their interest at the commencement of a performance. The fade is one of the simplest effects to produce and its intelligent use will do much to enhance the value of a film.

Filmers who make use of compensated processing are at a disadvantage in that they cannot produce the effect at the camera. If they wish to do this, they should reserve one reel for the purpose and shoot all scenes involving fades on it. Any surplus can be used up on straight titles and the reel sent away for processing with clear instructions that compensation is not to be applied. Alternatively, the effect can be produced after processing by means of one of the chemical faders available from most dealers. The effect is, however, best controlled at the camera and a fading gadget should always be included in the cameraman's kit.

In its simplest form, it consists of a piece of glass, say, four inches long by one and a half inches wide, "shaded" from clear glass at one end to full black at the other. It is drawn across the lens immediately in front of the hood and so progressively reduces the amount of light reaching the emulsion until the image is completely blacked out. It operates conversely, of course, for a fade-in.

Now it is not easy to apply a uniform grading to a piece of glass by means of some tinting medium, but the effect is readily achieved photographically if a "still" camera is available of sufficient size, say, not less than quarter plate. A piece of white drawing paper is obtained about 3′ x 2′ and by means of the "toothbrush and comb" method or a paint spray, is graded from full black over the first quarter to white over the last quarter. The most convenient material to use is "poster" or "showcard" colour from an artists' supply shop. The paper is then fixed up on a wall, preferably outside in well diffused light and photographed. The camera should be situated so as to "fill" the negative and a better grading will be obtained if the image is thrown slightly out of focus. The resultant negative will produce an excellent fading glass.

If a plate has been used, the emulsion should be scraped off along a strip about ½″ wide down the centre and the glass cut into two halves. Two fading glasses will thus be produced. Each should be fitted with a cover strip to protect the emulsion and bound with adhesive paper after the



manner of a lantern slide, although the binding will have to be omitted from the "clear" end.

If the negative is on roll film, the film can be placed between two clear glasses and bound up in a similar way. If the clear portion is not as clear as might be desired, it may be advisable to make the cover glasses about an inch longer than the negative. The fade will therefore commence as soon as the slight discoloration of the "clear" portion of the negative comes in front of the lens.

This type of glass has one slight disadvantage. To the critical eye looking for defects, the slight distortion due to the refraction

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of the glass as the leading edge of the "clear" end passes across the lens causes a "ripple" effect on the screen. It will not be noticeable, however, to the average member of an audience. The trouble is eliminated by the use of a disc form of fading glass, but as its construction is somewhat more complicated, I propose to leave the description to another occasion. The type of glass described definitely scores on the grounds of simplicity.

When artificial illumination is used, the possibility of fades by the use of a dimmer on the lighting system should not be forgotten. In an emergency, too, quite good fades can be made with the lens diaphragm. Generally, in outdoor work, a relatively small stop is used and consequently there is not sufficient range between the working stop and the smallest stop to allow for a proper fade-out to blackness. The use of a strong filter will help, but even a X4 will be insufficient to fade out scenes involving sparkling water in the dearly beloved sunset ending so often found in travel films.

In my own opinion, the use of an auxiliary stopping down device provides the best form of controlling camera produced fades. In its basic form, it consists of two V-notches cut in two cards and held to overlap, forming a square opening. As the cards are made to slide over one another, the square opening is reduced in size until it is finally obscured completely. The process works in reverse, of course, for a fade-in. As I believe in making a "professional" job of home-made gadgets, the design shown in the accompanying diagrams has been evolved. Metal is used as it makes a neater job and although care is required, ordinary tools of the hacksaw, file and soldering iron variety are all that are needed in its construction.

Two V-notched plates are usually too short to slide freely and in addition, the "points" are fragile. To overcome these snags, I have used two plates in each of which there is a full square opening (4) the complete assembly as seen from the front is shown at (1); the two plates are shown with the openings coincident and passing the maximum amount of light at (2); and in (3) the opening is shown completely blacked out. The movement is controlled by a single lever and as this should be fairly long to give accurate control, the external portion has been made to be detachable. With a long lever sticking out the gadget would be clumsy and liable to damage.

The body is made up in $\frac{1}{16}$" brass sheet. The back plate is first cut roughly to size allowing for $\frac{1}{4}$" edges to be turned up. The first edge is turned up in the vice. Next, a former will have to be made equal in width to the width of the sliding plates. A piece of ordinary mild steel can be used for this, not less than $\frac{1}{4}$" thick; the edges should be filed up square and parallel. The exact width is unimportant as the sliding plates can be cut to suit. The former is then placed on the inside of the back plate; both are clamped together in the vice and the second edge turned up. During this process, the back plate may "curl" a bit. To flatten it, place it on a flat surface such as the underside of an ordinary domestic iron. Put the former in position and hammer down on the former until the brass plate is flat and true. The inside corners of the upstanding edges may need a little truing up with a fine file, but avoid getting them out of parallel.

The upstanding edges must now be trimmed down with the hacksaw to stand up about $\frac{1}{16}$". For final trimming, another former is made from material rather thicker than the combined thickness of the two sliding plates. By placing it in position, the edges of the back plate can be filed down flush with it. This will ensure that they are parallel to the surface of the back plate and avoid the danger of taking too much off at any point. The outside edges are then chamfered off as seen to the left of (9) to allow room for the fillet of solder in the sweating-up process. The ends may now be trimmed up square and curved respectively.

The method of fitting the gadget to the lens may vary but in most cases a tube fitting can be employed to slide over the lens hood. This is shown at (5) and "20-thou" shim brass from a garage is used. When the tube has been formed to size, five easing slots (the sixth is at the butt joint of the tube) are formed and the tube inserted into a corresponding opening cut in the back plate by drill and file. The tube is then sweated in and fillet of solder run round as shown in the detail to the right of (9).

The cover plate can be made next and the circular opening and the slots cut out. The exact width of these slots is not important but they should be cut parallel.

The sliding plates (4) are next cut from the shim brass. If it is "curly," do not attempt to flatten it by hammering. Bend it to the opposite curve and drag it over some sharp edge such as the edge of a piece of wood held in the vice. Hammering will distort springy brass and it will be impossible to get it flat. They should be trimmed to slide freely in the back plate. The slot in the upper plate is marked out from the slot already cut in the cover plate. The positions of the studs are found in the same way, by marking through from the cover plate slots, and they are cut with a shoulder and

(*Continued on page 104*)

Secretary: **C. LESLIE THOMSON, B.Sc.**

Secretary's Report

AMONGST the lively and varied correspondence of the past few months are two letters from readers who suggest that T.I.D. caters too much for the advanced worker, that some of the constructional items are beyond the resources of the average experimenter, and that not enough attention is paid to the interests of the less experienced although enthusiastic amateur. We are grateful for these frank opinions, and indeed wish that others might be less reticent about expressing their views freely to us. But the situation is not simple. As we have repeatedly stressed, sound-on-film in the substandard gauges is a process which can be really successful only if rather higher-than-average accuracy is observed throughout. Gramophones and radio both provide our audiences with standards of reproduction against which the output of our talkies often sounds woefully primitive. This may be due to a number of causes, but most of these can be traced to an absence of the requisite accuracy.

We keenly appreciate that there is a world of interest and pleasure for the amateur who takes up sound experimentation—even though his results may sometimes be far below expectations. We also believe that the enquiring experimenter is the backbone of the amateur cine movement. But if what you, dear reader, want is to construct or adapt apparatus to give you real quality from sound-films, then you must face the fact that a certain competence in handling tools and machinery is essential. In substandard sound, many of the physical dimensions are so close to the limits of normal workshop accuracy that while the experienced mechanic may turn out a successful job at his first attempt, the beginner may gain little more than valuable experience.

If you wish to build a sound-projector, or to improve an existing machine, there are four satisfactory methods of approach:—1. Be an amateur mechanic with some experience of handling fine machinery, and with a basic knowledge of "radio" technique. Preferably have some good tools of your own, and, if at all possible, access to a lathe. 2. Start from scratch, with the clear understanding that you will learn mostly from your mistakes, which will be numerous, and somewhat wasteful of materials. 3. Cultivate the acquaintance of an experienced engineer—amateur, "model" or professional—whose interest in your efforts will lead him to do much of the work for you! 4. Have the tricky bits made for you by a professional—and smile when you pay the bill! If none of these appeals to you, then you will be well advised to wait until you can buy the kind of apparatus you want, ready-made. This may seem an unduly discouraging—perhaps even irresponsible—statement, considering that the purpose of T.I.D. is to help the amateur sound workers. Unfortunately, however, there are occasions when helpful advice can only be "DON'T."

If you feel that T.I.D. does not devote enough space to the subjects which interest you, please write and tell us what you do want. On numerous occasions we have said—and we mean it—that what we wish more than anything else is to hear about *your* experiences, and to have *your* opinions, so that T.I.D. can be a truly representative expression of amateur sound-film activity. We believe that we can give you a reasonable answer to most questions concerning the various aspects of this branch of cinematography—or at any rate start you off in the right direction. But *you* must ask the questions—and we rely on you to continue to provide us with fresh information.

Regular readers will know that Mr. Desmond Roe has for some months past been wrestling with a comprehensive treatise on sound-on-film recording. If this had taken its intended form, it would have been completed as a T.I.D. Note early this year. Instead, it developed into a much larger work—beyond the resources of T.I.D. to handle in the ordinary way. Mr. Roe has

therefore prepared an abridged version—"Elements of S.O.F. Recording"—which we hope will be in circulation by the time you read this. The full version will eventually appear in a more permanent form, probably available for outright purchase, but at the moment the style and method of publication are undecided. If you are interested, and would care to drop us a postcard indicating whether such a work would appeal to you, it would help greatly in the selection of the most suitable form.

Another item of news on the recording side is the very welcome arrival of a new member on our Board—Mr. R. W. Lowden—whose wide experience of many recording methods assures us that he will prove a most valuable addition. We feel sure that our Recording Team—Messrs. Roe, Aldous and Lowden—will be able to tackle any question on the subject!

We also welcome Mr. G. L. Warner, whose forte is commercial presentation. A "35-er" by profession, he has a keen interest in the future of substandard sound, and some of the very interesting items which he has already contributed are included in the discussion following this report. Mr. Warner has presented T.I.D. with a test length of 16mm. 5,000 c/s track, such as was recently recommended for checking the scanning system. This film will be available on free loan to amateurs. (See later item re Notes). Film of this type is easily spoiled, and we suggest that it should be used only as a final check on adjustments—after the projector has been thoroughly tested otherwise—and run through the machine as few times as possible. We hope to have further test-films of this type on hand shortly.

Mr. Warner suggests the establishment of a register of substandard films possessing really good sound quality. From such a list, he points out, the amateur could select films which would give his projector a chance to show its capabilities. As things are now, he has to take his chance, and if the sound is poor he may be unable to ascertain whether the fault lies with the film or the projector.

The value of this scheme will depend entirely on the support it receives from our readers. It is suggested that the simplest method of working would be for those interested to send in at intervals lists of films which they have found to be particularly excellent, and that in return they will receive a copy of the register to date. To make the report complete, the following details are essential:— Title of film; Library of origin; Copy number; Make and type of projector used. We would prefer that your lists should be short, and contain only the best specimens you encounter.

It was further suggested that a "black list" of really bad examples should be drawn up. Although we have a good deal of sympathy with the sentiment, we fear that it would be open to serious objections in practice. It is surely better to write personally to the librarian when you happen to receive a "dud." If you do, it is important to specify the copy number, and to make your complaint as definite as possible. It is of little value to the librarian to be told that "the sound was very bad," unless you can also describe the symptoms, or draw attention to the actual defect, with some exactness. In any case, do please make quite sure that your own house is in order before taking such action. Possibly your optical system requires adjustment, or the smoothing of your soundhead may have developed some fault.

(If your soundhead and amplifier are in really good order, defects in the film are revealed with startling clearness. Just as good illumination and critical definition of the projector show up graininess or lack of sharpness in the picture, so the aural impression of a poor recording is quite distinct, and not easily confused with distortion in reproduction. But if your outfit is below par, it may be very difficult indeed to determine where the responsibility lies. If one was troubled with a flat and muzzy picture and if the projection lens was of doubtful quality, it would be almost impossible to tell from the image whether the lack of detail and contrast was due to defects in the camera, the processing, or the projection.)

"Sound Tracks and their Faults," by Philip Jenkins, provides much excellent information on this subject. This, or any other T.I.D. Note may be borrowed by sending 4d. in stamps to cover postal expenses. The other subjects are:— "Effective Presentation," "Elements of S.O.F. Recording," and "Dual-Gauge Soundhead" (Pathe 200B Plus). In addition we have short reports on successful conversions of several makes of projector.

From Gunner P. Lord, who is a projectionist in civil life, we have received a most informative contribution, describing the experiences of a professional operator, and the work and responsibilities which face the apprentice at each stage of his promotion, until his final emergence as a "First Projectionist."

This article, which also deals with several simple but effective tricks in presentation, may be borrowed in the same way as a Note.

A new Note by Philip Jenkins—"Intermittent"—describes in detail the construction of a cam-actuated claw mechanism for substandard projectors. This type of drive is

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The main business of this T.I.D. is devoted to a selection of hints and tips on projector and amplifier maintenance, as well as some suggestions for improving existing apparatus. These "TID-bits" have been contributed by several workers, amongst whom Messrs. Aldous, Jenkins and Warner should be particularly mentioned. Although the items are arranged more or less in sequence, it will be obvious that they do not all apply to the same types of equipment.

Ringing and Roaring

Microphony can be troublesome in high-gain amplifying equipment, especially in talkie work where the amplifier is often mechanically linked with machinery in motion. The amplifier may have an excellently quiet background until the projector is started, when an unpleasant grinding, whining or ringing sound may come from the speaker, in sufficient volume to spoil the realism of the sound. Such microphony may easily be overlooked by the operator near his machine, as it is usually "in step" with the normal projector sounds.

Microphony is quite distinct from electrical interference, or crackle, and can arise at a large number of points. Obvious suspects are the P.E.C. and the valves. The photocell is less often guilty than many suppose. In fact, it is fairly safe to say that any good modern cell is practically non-microphonic when used in normal talkie equipment. However, to be on the safe side, the cell should be insulated with felt or sponge-rubber. It is worth noting that it is usually more effective to "sponge-mount" the cell-holder—or if possible the entire sound-head—than to isolate the actual cell. The greater the sprung mass, the less the vibration at audible frequencies.

High-grain valves are liable to be "pongy," but, as pointed out in a previous T.I.D., the use of pentodes rather than high-mu triodes in the voltage-gain stages greatly reduces the trouble. This is due probably to the wider spacing of the electrodes in the pentode, and also to the screening of one electrode from another.

The lead from the photocell to the first valve is exceptionally sensitive, and if it is of screened wire—as is often the case—then the fatter the cable the better.

(A type of interference which may be confused with microphony is the low-pitched burring sound caused by a stray gleam of the projector light reaching the cell. The "chopping" of the shutter produces a note which can mutilate the sound, without itself seeming to have any appreciable volume.)

The exciter-lamp is a source which is rarely suspected. The filament very often has a natural vibration frequency in the middle of the audible register, and may produce a loud ringing note when the projector is running. This should occur only if some part of the scanning system is out of alignment—assuming that the equipment is properly designed. The movement of the filament causes the light-beam at, for instance, the objective lens to move back and forth and to be intermittently partly obscured by the lens-mounting. Or the beam may vibrate near the edge of a mirror, with similar results.

To overcome this, turn the amplifier full on, and while tapping the exciter gently, adjust its position until a point is found where the ringing ceases. This should also be the position of maximum sound volume, and occurs when the beam falls squarely on each essential component. Usually the silent setting is midway between two equally noisy positions, and as the placing may be quite critical, some form of continuous adjustment, such as a screw, is very valuable.

While on the subject of exciters, another type of trouble is due to stretching and sag of the filament, which can throw the system completely out of alignment. It is most troublesome when long (high-voltage) filaments are over-run. For instance, with a 12-volt car bulb, over-volted to obtain more intense illumination, it has been found that the filament not only sags during operation, but rarely returns to the same position each time it is used. The remedy is obvious—use properly designed exciters, with short compact filaments, and don't over-run them.

Vibration

It is realised, of course, that it is more satisfactory to eliminate vibration at its source than to compensate for its effects. For this reason a good solid construction for the projector body is desirable, with no large panels to resonate or "drum." If the projector is too lightly constructed, it is often possible to "kill" resonance by bolting

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chunks of typemetal, cast to suitable shapes, against sheet-metal or other vibrating parts. A similar method, when using light projectors with noisy mechanism, is to provide a heavy, solid base for the machine, insulated from its support. This can be obtained, in its simplest form, by gluing a thick felt typewriter mat to the underside of a heavy wooden base (like a bread-board, but preferably at least two inches thick) and fixing the projector to the upper side of the board either with bolts and nuts, or by means of wooden strips—whichever best suits the individual machine. The mass of the base steadies the projector, and the felt lessens transmission of vibration to the supporting stand or table.

For tracing vibration to its source the fingernails are very acute detectors. But better still is a rod held in the teeth, since this is more sensitive, and the actual frequency of the vibration is revealed. Incidentally, it should be remembered that in any machine—not necessarily a projector—noise and vibration generally mean that wear and tear are proceeding at an excessive rate.

Projector Installation

A very convenient projector-stand, where permanent installation is not desired or inconvenient, is provided by a dumb-waiter (i.e., a dinner-wagon on castors). The entire set-up can be left undisturbed, and wheeled into place when required.

The mains connection should be of heavy flex—preferably V.I.R. cable ("cab-tyre")—and not light twisted twin. It should be tied round or to a leg of the stand, so that in the event of someone tripping on the wire, the projector is not dragged on to the floor. An additional precaution is the use of a good-quality plug-and-socket joint in the mains cable which will pull apart if it is tugged. This saves the cable from frequent and annoying breakage at the mains plug.

Connectors

Plug-and-socket connections should always be fitted with the socket on the supply side. With the plug on the load side, no harm is done if the pins are accidentally touched or shorted. There are enough different types of plug and socket on the market to make it inexcusable to use the same kind for mains and for speaker or pick-up connections. (Yet how often does one find the flat 5-amp type used indiscriminately by the amateur. Most loudspeakers will not stand having the mains connected to the speech-coil, yet, in one recent instance of this folly, it was the mains fuse which blew!) 3-pin plugs and sockets should be used for mains connections, and don't neglect the earth lead. It is just as important as the current-carrying wires, and it should be connected to the body of the projector and, *except in the case of AC/DC types*, to the amplifier chassis also. Apart from increased safety, this usually reduces background hum quite appreciably. Flat 5-amp plugs are very handy for pick-ups and microphone connections, although the standard telephone jack-plug is much neater, and lends itself better to efficient screening.

For speaker connections, which usually require three or more connections, either 2-amp or 5-amp three-pin plugs may be used, although these are undesirable if similar units are used in the mains wiring. In such cases, or where more than three contacts are required, the standard British 4- or 5-pin valve-bases and holders make excellent connectors. If a non-reversible two-way connector is required, 3-pin mains-type plugs may safely be used if only the "N" and "E" terminals are in circuit. If the plug is accidentally connected to the mains, the risk of damage is negligible.

Fuses are very liable to be overlooked by designers—both amateur and professional. There is much in favour of having a separate fuse for each item supplied by the mains. Lamp, motor, amplifier and any subsidiary unit should each have a fuse rated as close as possible to normal load. This is particularly desirable where a resistance is used for voltage-dropping, or where different types and voltages of mains are used. Mistakes and accidents can otherwise be very expensive. Any reduction in the load on a resistance allows the output voltage to rise dangerously. Connecting a transformer to D.C. mains may burn it out in a few seconds.

Photocell Circuits

The photocell circuit is a very prolific source of trouble. The resistances involved are so high, the currents so minute, and the amplification so great, that any little defect is painfully evident. Perhaps the commonest trouble is variation in the applied voltage. The most usual arrangement for providing suitable polarising is a potentiometer connected across the H.T. supply. This potentiometer may be variable, or it may consist of two fixed resistors. Fixed division is more stable, and means one less control to contend with, but it is a compromise. Variable control, on the other hand, allows the operator to be sure that the cell is working at its optimum.

To ensure stability, it is desirable that the current flowing through the voltage-divider should be reasonably high—several milliamps. But the usual radio-type potentiometer is not intended for such high currents, and would deteriorate rapidly. One method of

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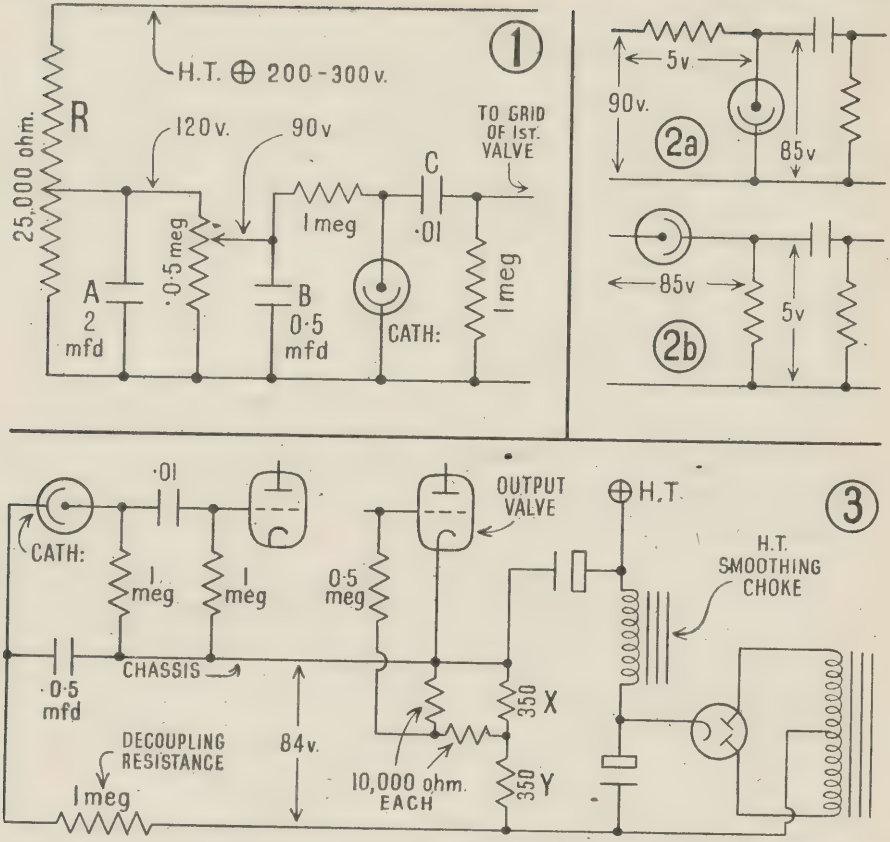

Fig. 1. Circuit providing noiseless control for P.E.C. voltage.

Fig. 2a. "Earthed cathode" cell-circuit, showing voltage distribution.

Fig. 2b. Alternative circuit, in which both anode and cathode are "live."

Fig. 3. Method of obtaining cell polarising voltage across resistance in H.T. circuit of amplifier. (KT66 output valve, approx 120 m.a. total current).

overcoming the dilemma is shown in Fig. 1. A high-current voltage-divider provides approximately the correct potential, and fine control is effected by a high-resistance potentiometer, through which very little current passes. The resistance R is conveniently in the form of a wire-wound "bleeder," rated at 10 or 20 watts, and with an adjustable tapping-band. For 200-300 volts H.T. a suitable value is 25000 ohms. The voltage across the control potentiometer need be no more than 100-120 volts, and any good 0.5 meg. instrument will handle this comfortably.

Quite a different approach to the problem is shown in Fig. 3. Here the cell-voltage is produced by inserting a resistance in the H.T. minus lead. Assuming a total H.T. current of 120 milliamps (with an output valve of the KT66 or 6L6 type) a voltage of 84 will be produced across the resistance XY (700 ohms.). This voltage will be *negative* with respect to the chassis, and must therefore be applied to the cell *cathode*. This system has the advantage of eliminating entirely any surge-voltage across the cell, such as occurs when the rectifier reaches working temperature before the amplifying valves. (Directly heated rectifiers are very undesirable in circuits involving P.E.C.'s, unless the output valves are also directly heated.)

Condensers in the cell-circuit must be above suspicion. Any small leak in these,

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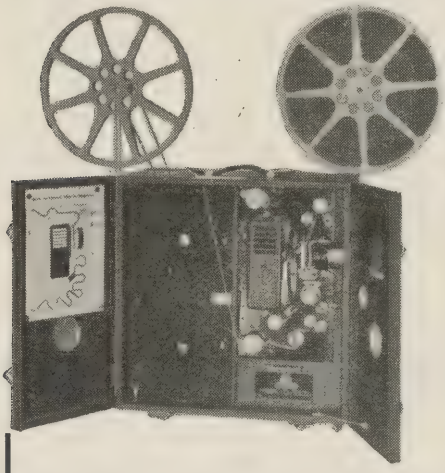

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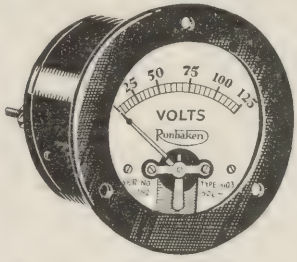

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such as would be negligible nearer the output end of the amplifier, may upset the voltages very greatly. Look again at Fig. 1. Let us assume a small intermittent leak in the condenser B. The leak current may easily be much greater than the cell current, and would thus considerably reduce the voltage reaching the cell. Crackle or fading will result. Condenser C is even more critical. A similar leak here would not only reduce the cell voltage more drastically, but would raise the grid potential of the following valve, so that faint and distorted sound would be produced. A good-quality mica condenser is essential in this position. An electrolytic condenser might be used in position A, but preferably a good paper type, of high rated voltage. For B, paper type—or mica, if obtainable—is required.

Experimenters are sometimes puzzled by the varying relationship of the cell and its load resistor as found in different circuits. The two essential variations are shown in Figs. 2a and 2b. 2a is the system used in the T.I.D. amplifiers (*A.C.W.*, Sept. and Dec., 1942), and is most convenient when the cell has to be separate from the amplifier. Since the cathode is at chassis ("earth") potential, a single screened cable forms a very convenient conductor, with the outer braiding acting as one lead. Fig. 2b shows the arrangement more commonly found when the cell is housed within the amplifier casing. The *signal* (output) voltage of each is identical, but the distribution of the *polarising* voltage is significantly altered. In talkie work, the cell current rarely exceeds a few microamperes, hence the voltage drop across 1 megohm load resistor will only be a few volts—say five. Assuming a normal 90 volts polarising, the other 85 volts must exist across the cell. Comparison of the two arrangements will immediately show that the potential across the coupling condenser is much greater in the "earthed cathode," and hence there is a greater necessity for a reliable component.

At the risk of boring some readers, and perhaps contradicting the advice of some manufacturers, here is a description of the simplest method of checking and setting the cell voltage. With the normal exciter beam falling on the cathode, *slowly* increase the potentiometer setting until a faint bluish haze is seen in the cell. This indicates ionisation, and with most cells produces loud, noisy and distorted signals. (If allowed to continue for a long period, and if very intense, it may permanently damage the cell.) Now slowly turn back the control until the blue haze just vanishes. This is the point of optimum sensitivity, and will give the maximum stable output from a given scanning-beam. In most cases it is much

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easier to avoid noisy background if the cell signal is kept as strong as possible. Both microphony and interference are rendered proportionately less strong.

Signal Generators

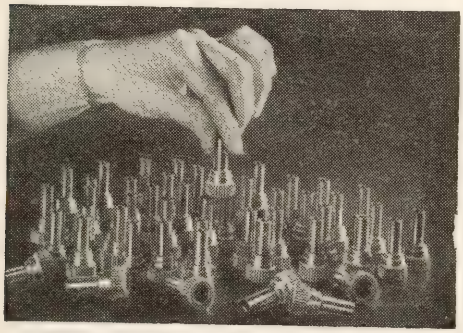
When searching for faults in the cell circuit or first stage of an amplifier, where the otherwise very useful gramo pick-up is not applicable, and when it is inconvenient to have sound-film running through the projector continually, one method of obtaining a useful and steady signal is to place an ordinary electric lamp, run off A.C. mains, so that its light falls on the cell. This will produce a strong 100 c/s. hum signal which is easily identified. In other cases, where this "mains hum" frequency is undesirable, a simple "signal generator" consists of an ordinary hair-comb and a flashlamp. At about a foot distant from the cell, draw the comb briskly past the bulb, so that a series of broad shadows falls across the cell. The result is a "wheep" with a volume comparable with that of sound-film modulation. If something more refined and continuous is required, it should be a simple matter to "fake up" a clockwork or motor driven perforated disc or toothed wheel, to run close in front of the bulb. A signal of this type is very useful in assessing—roughly—the effects of altering various components in the amplifier.

To find a "lost" signal in an amplifier, radio servicing manuals describe the use of a pair of high-resistance (2,000-4,000 ohm) headphones. One lead is connected to the chassis, and the other—usually through a condenser (0.1 mfd or less)—is connected in turn to various points in the circuit—e.g., grids and anodes of valves—until the signal is located or the spot at which it vanishes is found. This technique can be rendered more convenient by soldering 6" prods on the phone leads. Each prod should be insulated with systoflex sleeving, except at the tip, which may be filed to a point, and may be of 16 or 18g. brass or copper wire. These facilitate making contact with otherwise inaccessible terminals, etc. (The insulation is important, since apart from the risks of shorting parts of the circuit, a very nasty shock may be waiting for you somewhere.)

Amplifier Chart

Finally, here is a suggestion which is so obvious that not one amateur in a hundred seems to put it in to practice! Once you have your amplifier working to your liking, make a complete circuit diagram of it—no matter how roughly—and then take readings of the working voltages at as many points as you can. A high-resistance voltmeter is obviously desirable here, and in every case use the highest voltage range first. If the deflection is too low for accurate reading, use a lower range. On your chart make a note of each figure, *and beside it a note of the meter range used.* Points to read include :—Valve anodes, cathodes and screens : Tapping-points of potentiometers and decoupling circuits : H.T. supply on each side of the smoothing choke. All these readings should be taken between chassis (earth or H.T. minus) and the point tested. Heater voltages should be taken across the valve terminals. Readings in the cell-circuit should also be taken, but don't expect these to bear any relationship to the true voltages : the current taken by the meter will be many times greater than the normal currents, and very large voltage drop will occur. This, however, is immaterial for the purpose on hand, which is simply to make a record of normal readings *on a given voltmeter.* Once you have these, and your amplifier does go out of order, it is the work of a few minutes to check over all the points, and the defective portion will almost certainly be betrayed by an abnormal reading.

Planning ahead for peace time.!



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DO IT YOURSELF—*Contd. from page* 90

sweated in as shown at (10). Do not try and cut the slots to suit the studs as it will prove to be a very difficult task.

The discs shown at (6) are cut and one is sweated to the cover plate and drilled and tapped. The spring washer (8) is cut from shim brass and dished slightly by hammering on the centre, so that the edges will press down on the lever (7). The quadrant is cut out of $\frac{1}{16}$" sheet and here again, form the slot first and trim the edges to suit. Do not try and position the slot in the middle of a previously trimmed strip.

The parts can now be assembled and any adjustments made. As soon as everything works freely, contact surfaces are tinned and the cover plate is secured by running a fillet of solder into the joint as shown in the detail to the left of (9). Wrap a damp cloth round the mounting tube and so avoid any danger of the joint coming adrift. Clamp the plate together and solder on the square end piece and quadrant. Assemble the lever and if everything works smoothly, add the spring retaining clip for the extension lever. This is shown at (11) and the method of fitting at (12). The end is slipped under the retaining clip (shim brass) and pivots around the head of the screw.

The inside surfaces will have to be blacked prior to the final assembly. When all the soldering is completed, the whole gadget should be cleaned up and finished with a good coat of optical black polished to a dull lustre with a soft cloth. It will then form a handsome addition to the camera kit and will not look out of place alongside the most expensive equipment.

THE BUILT-IN EXPOSURE METER

(*Continued from page* 105)

The trouble with these "foolproof" devices is that they tend to produce a sort of standard mediocrity of result. For example, automatically compensated processing is an admirable way of getting *something* out of the majority of cinematic snapshots, but the advanced worker who wishes to obtain special effects of mood and depth, and to incorporate fades knows that all these will be smoothed out from the film as abnormal by the photoelectric device which is designed to reduce all exposures to one common denominator.

My own feeling is that as we already are denied the privilege of processing our own films (although I have myself done many thousands of feet), at least we should enjoy the individuality of exposure control. Luckily, it is unlikely that this will ever be denied to us, in spite of coupled exposure meters.

GEORGE H. SEWELL, A.R.P.S.

Have you ever wondered whether there was not something else that you could do to help the war effort? There is one job that we can all do, and although not a spectacular one it is of vital importance at this stage of the war, when a big all-out effort has to be made to ensure victory. The job is an easy one—just the salvage of every single scrap of paper you can find.

THE BUILT-IN EXPOSURE METER

Sir,—May I combat most vigorously the suggestion in Mr. Wiles' letter under the above heading, that an Exposure Meter built on to the cine-camera *with auto-coupling to the lens* would in any sense be an improvement. It would in fact be an expensive piece of self deception. By all means have your meter built into your camera, if you prefer to handle one piece of apparatus instead of two, but do not couple it directly to your lens because it will quite as often give you the wrong exposure as it will the right one.

Photo-electric exposure meters are of three main types (a) Highlight, which measures the power of the light falling on the subject (b) the normal type which measures the light reflected from the subject and (c) a narrow angle version of the normal type which measures the light reflected from only a small area of the subject.

There is no immediate point in coupling (a) to the lens because you take your reading facing the light source and not the subject, while in the case of (c) the technique is to take narrow angle readings of high-light passages and shadow passages and decide from these the most appropriate exposure. In the case of (b) the meter collects *all* the light coming from the subject, and a few moments' reflection will show that its readings must not be taken literally but interpreted to give correct results.

Suppose a subject of landscape type, one half foreground, one half sky, gives an exposure reading of X. Without altering anything else swing the meter downwards until the foreground occupies two thirds and the sky one third, and because of the larger area of darkness within its field the meter will indicate an exposure of 2X. Swing the meter upwards until the sky is two thirds and the foreground one third and the exposure indication is ½X. Yet, if you are primarily interested in recording subjects in the foreground, the same exposure should be given in all three cases.

To take another case. You are facing a white cliff which except for details of construction is continuous and solid, and the meter gives a reading of exposure X. You then take ten paces to the left and face the cliff again. This time the dark mouth of a cave occupies half your scene. The meter will call for exposure 4X, yet if you give it you will grossly overexpose the white cliff around the mouth of the cave.

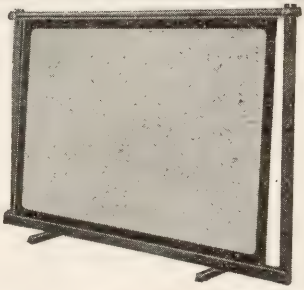
At least, you would do so if the film had not very considerable latitude. Many users are much more indebted to this quality of latitude which has been incorporated in the film by its makers than they are ever aware of. It covers up not only their own unaided errors of exposure, but also those which are due to uninformed use of the exposure meter. That is why when they come to colour film they find they have a smaller percentage of successful results. Colour film has, by reason of its complex character, less latitude than has black and white film.

Users should learn to understand that the exposure meter is only a very efficient method of measuring either the amount of light falling on the subject or the amount of light reflected from it, but that it cannot analyse the distribution of light intensities within the subject, or decide which part of the subject must receive truly correct exposure and which part can be sacrificed should it be beyond the latitude of the film. It cannot think. Thank goodness that is still left to the cameraman.

Actually, the most suitable instrument to couple to the lens would be the highlight meter, because the theory here is that exposure should be relative to the incident light intensity, and that darker objects will automatically be rendered darker and lighter objects lighter in the film record. So that a fairly high proportion of results would be successful. But even here it is desirable that the cameraman should be able to modify his aperture from the reading obtained.

(*Continued at foot of previous page*)

RAYBRITE Screens



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